

was first shown the Portapunch, he saw the possibility of using it to computerize U.S. elections. As applicant was also a U.C. professor of Mechanical Engineering at the time, Prof. Harris sought from me technical and patent help. I contracted with him to write his basic patent (U.S. Patent No. 3,201,038), and to design and build his initial "Votomatic" prototype, which is now in the Smithsonian. The second basic patent on the Votomatic, the '409, was written by my then patent attorney, Gordon Wood. It is interesting that it should be cited against my '190 patent application, but it is of course right that it should be, because it is the limitations of the '038 and '409 patents that after the Florida debacle of November, 2000, motivated me to try to solve the 45-year old "hanging chad" problem.

To understand why the hanging chad has given so much frustration to so many talented engineers, it is necessary to study the patent on the IBM Portapunch, '620, in detail. The critical figure is No. 5, which is an enlarged view of the prescoring (also called "preperforations"). In this drawing it will be seen that the prescoring is discontinuous, being omitted at the four corners in what was called "frangible connections" 28. These were deemed to be essential to keep the chads from falling out while the ballot was handled. As is evident from Fig. 10, the stylus may strike the prescored index area (chad) eccentrically (discussed in lines 18-37), and this can cause chads to hang by 1, 2, 3, or 4 "frangible connections" 28. The observed frequencies of various types of hanging chads were tabulated and reported in Exhibit A, p. 231, of a book published in 2001 by the Miami Herald, called "Democracy Held Hostage," by Martin Merzer. A copy is attached. It will be evident from this tabulation why the inventors of the '620 patent devoted so much of the specification to describing means to minimize the number of hanging chads and dimpled chads. Applicant believes that the reason IBM put the '620 patent into the Public Domain on January 16, 1973, six years before its expiration, was to avoid costly chad-produced litigation.

7. The first paragraph on p. 4 of the Office Action recites the structure of punch 256 (Fig. 6; col. 5, line 72 through col. 6, line 8). This statement with respect to punch 256 is incorrect. If Figs. 3, 4 and 6 in '945 to Bower are examined closely it will be evident that:

(a) '945 disclosed a combination of reader 254 and punch 256 in series. The direction of movement of card 13 is shown by arrow 250 to be up and to the left, so the reader 254 precedes the punch 256.

(b) Fig. 4 is a section through Fig. 3 viewed from the far side, so if arrow 250 were to be shown in this view, it would be pointed to the right. The card 13 is read before it is punched.

(c) The punch 256 is described as a standard IBM punch in col. 3, lines 73-75.

(d) Aperture 270 cannot be made in card 13 by the punch 256 because they are 7 or 8 inches apart.

(e) There is a light source 272 below the reader 154, but none below the punch 256.

How do a card reader and a card punch differ? There are three fundamental distinctions. An ideal punch has:

(1) A user

(2) A user-controlled stylus

(3) Backlighting intensive enough to show all users (voters) that a hanging or dimpled chad is partially or totally blocking the hole that has just been punched. A 10 to 30 watt light source is recommended.

An ideal reader has:

(1) No user: All-automatic is always most economical.

(2) No user-controlled stylus. As a card reader is relied on to make tabulations, the presence of a stylus in the device would raise concerns that the program that controlled the tabulator could be instructed to manipulate the vote totals. (In the Votomatic system the punching is done in the precinct, the reading and tabulation at the counting center, which is usually several miles from the precinct.)

(3) Because the counting is automated, there is no user available to correct any hanging or dimpled chads, so the "light source" needs only a low wattage light-sensing transistor, in all cases less than say 3 watts for 12 photoers, or one fourth of a watt per photoer.

Examination of patents '409 and '945 shows that '409 has no electronic reader, no backlighting, but does have a user and a user-controlled stylus, and this is why applicant proposes to modify the '409 patent by adding "hole correcting" illumination so the voter can discover any imperfections in his/her punching efforts and repair them by repeat punching as many times as needed.

Is there anything in the Bowen disclosures that would be of any help in getting rid of hanging and dimpled chads? Nothing whatsoever, that applicant can discern. Examiner's suggestion that patent '409, which lacks a hole-correction system, might be improved by adding features from patent '945, which also lacks a hole-correction system, to achieve a new voting device that inexplicably has a hole-correction system. Applicant feels this is not a contention that is justifiable. Realistically, the Bowen '945 device must certainly be just as plagued by hanging and dimpled chads as the Harris '409 device has been. (As applicant owns a 25% interest in the '409 patent, he has lived with the "hanging chads" for nearly 45 years. In that long period he has observed that many talented engineers have been unable to find a solution to it, obvious or non-obvious.)

With regard to the second paragraph of p. 4 of said Office Action, as the "teachings of Bowen" do not include any "hole-correction" system, and the subject matter of Bowen (Cl. 235/61.1) is for a reader rather than a punch, the rejection of claims on the basis of Bowen's teachings is not logical: no user, no user-controlled stylus, inadequate illumination for discovery and correction of punching errors as backlighting is applied to the reader 254 but not to punch 256.

The same grounds for the rejections recited on page 5 of the Office Action citing Bowen's reader are again not justified. The lack of a hole-correction system is particularly apparent in Bowen because his disclosure includes both a reader 254 as well as a punch 256, and all the lighting is associated with the reader and none with the punch. If the use of backlighting with a punch is such an obvious expedient, why did Bowen not use it in his punch?

8. The introducing of yet another reader (Yamashita et al, patent '337, U.S. Cl. 235/61.1) which, like Bowen, also lacks a hole-correcting system, raises the same questions. Where is the hole-correction system of applicant's '190 conception coming from? All three of the citations lack any such system. The distinctions between a reader and a puncher listed above also apply in this case.

Yamashita et al discloses a ~~punched card~~ device that reads a previously punched card. On the relevant description in Column 2 lines 60 to 62 of patent '337 to Yamashita this sentence appears: "Numeral 12 designates a back cover to prevent dust from attaching to the sensor matrix." (Underline by applicant.). Since element 12 in Fig. 1 is on the opposite side of the card from the lights 10, this means that the lights are in front of the card, and not behind it. Further, as there do not appear to be any apertures in "back cover" 12, no light beam originating at light source 10 could reach the eye of a user. Also the process described in the '337 patent to Yamashita is automated (electronic), so there is no mention of a "user" or any "hand-positioned cutter assembly." Applicant has made no claim to the concept of "front lighting" a ballot card, such as disclosed by Ahmann in U.S. Pat. No. 3,620,587, Figure 8, element 73.

9. The citing of Ahmann has the recommendation of being related to punch card equipment, but the light 74 is above the card punch and like the general overhead lighting of the polling place is not useful for alerting the voter to the presence of a hanging or dimpled chad in a punched hole.

10. There is nothing in Cason Sr et al that is useful or helpful for the '190 patent application. No card punching is disclosed, so no hanging chads can occur, and the switch tripped by entry of board operates a solenoid that has in its circuit a small signal light rather than a high wattage illumination system designed to alert the voter to an impediment in his punched hole.

11. As in the above mentioned citations, there is no teaching by Rapp in his '550 patent that affords hole correction aimed at reducing or eliminating dimpled or hanging chads.

#### Response to Arguments

12. Applicant believes that his arguments with respect to claims 1, 9-11, 15 and 24 are all valid and hopes that Examiner's grounds for rejection will have been eliminated.

#### Conclusion

In the interest of accelerating the allowance of the subject patent application, which has been granted special treatment because of the age of the applicant (87), the following changes are proposed:

Claim 1, line 1, insert ---user-controlled--- before ---stylus---.

Claim 1, line 2, insert ---of at least three watts--- after ---light source---.

Page 13, lines 17 and beyond to top of p. 14, insert paragraphs (u) and (v) as stated in "Version of Decided, 2004."

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